

REMARKS

Applicant wishes to thank the Examiner for his careful review of this application. Please reconsider this application in view of the above amendments and the following remarks.

Disposition of the claims

Previously, claims 1 – 6 were pending. By way of this reply, claims 1 and 5 have been amended. Claims 2 and 6 have been canceled in view of the amendments. Therefore, claims 1, 3 – 5 are currently pending. Claim 1 is independent. Claims 3 – 5 depend directly from claim 1.

Amendments to the claims

Claim 1 has been amended to incorporate limitations of claims 2 and 6 in order to further clarify the present invention. In view of the amendments made to claim 1, claims 2 and 6 have been canceled as being duplicative. Accordingly, claim 5 has been amended to depend from claim 1. No new matter has been added.

Claim 5 has also been amended to recite “visible light” instead of “white light.” This amendment was not done in view of prior art, but solely for the purpose of keeping a consistent language. No new matter has been added by way of this amendment.

Rejections under 35 U.S.C. §103(a)

Claims 1 – 6 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Kobayashi *et al.* (U.S. 6,601,980) in view of Weidel (U.S. 2002/0196639). By way of this reply, independent claim 1 has been amended, claims 2 and 6 have been canceled. To the extent that this rejection may still apply, Applicant respectfully traverses this rejection as follows.

Claim 1, as currently amended, recites a vehicular headlamp comprising an infrared light source comprising a semiconductor infrared light emitting element; a visible light source comprising a semiconductor visible light emitting element; an optical system for emitting the lights towards a substantially same emission area in front of the vehicle; and a lighting circuit for turning on the infrared light and visible light sources. The optical system of the headlamp comprises a reflector for reflecting the light emitted from both the infrared light source and the visible light source towards substantially the same area in front of the vehicle. Further, both light sources are located in the vicinity of a common focal point of the reflector. The lighting circuit for turning on the infrared light and visible light sources is capable of controlling the strength of the emitted light such that the visible light blends with the undesirable red light emitted from the infrared emitting source to yield a white light within a predetermined range in chromaticity coordinates.

In rejecting claim 1, the Examiner asserted that Kobayashi meets each and every limitation of claim 1 except for the source of light emitting element, and then relied on Weidel to provide the missing “semiconductor light emitting element” limitation. The Examiner further asserted that it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the two-dimensional diode array of Weidel in place of the conventional incandescent lamps of Kobayashi for reasons of cost, durability, and life. Applicant respectfully submits that this assertion is incorrect.

First, concerning the teachings of Kobayashi, the headlamp of Kobayashi differs from the headlamp of claim 1 in more than just the type of light generating element used. For example, claim 1 recites that the headlamp has an optical system comprising of a reflector for directing the emitted light from the infrared light source to a substantially same area as that of a

visible light source. The two light sources are both located in the vicinity of the reflector's focal point. Claim 1 also recites a lighting circuit for controlling the strength of the light source such that the combination of the emitted light from the visible light source and the infrared light source falls in a predetermined chromaticity range.

As disclosed by Kobayashi and the present application, one common problem that both headlamps attempt to address is that the infrared emitting element would inevitably emit light in the visible range of the spectrum corresponding to red color. In the case of conventional incandescent light sources, infrared radiation is obtained by using infrared filters. However, as noted by Kobayashi, no filter can completely block out visible light (column 1, lines 31 – 35). To overcome this problem, Kobayashi teaches a perforated multilayer film that transmits both infrared and visible white light. By allowing white light to co-transmit with the undesirable red light, the redness of the infrared emitting headlamp is thereby reduced.

Keeping in mind that the purpose of an infrared emitting headlamp is to direct infrared radiation to areas not covered by the visible head light so as to increase the area visible to the driver at night via a CCD camera system, the amount of co-transmitted white light poses a potential source of image noise for the CCD camera. Thus, Kobayashi's multilayer approach must also deal with the problem of potentially introducing a higher level of noise in the camera image. To this end, Kobayashi teaches that the ratio of white-light to infrared light may be adjusted via the perforated pattern of the multilayer film (column 5, lines 49 – 55) so as to obtain an optimal level of image quality and reduced redness in the lamp.

In contrast, the lamp of claim 1 utilizes a control circuit to control the strength of the infrared light emitted from the infrared light source and the visible light emitted from the visible light source. Both of the light sources are located in the vicinity of the focal point of the

lamp's reflector. The strength of each lighting source may be controlled such that when the two lights are mixed, the combined light would result in a predetermined chromaticity. For example, in one exemplary embodiment disclosed in the specification (page 9, line 13 – page 10, line 9), the visible light may be of a wavelength complement to the red light (e.g. cyan) so that when the red light and the complement visible light combine, a white light is generated. Kobayashi does not teach at least the limitation of such a lighting circuit.

Furthermore, a semiconductor element, in general, is smaller than a conventional light source such as a filament. Thus, according to the present invention, because both the infrared light source and the visible light source comprise “semiconductor light emitting elements,” they can be disposed in close proximity to a common focal point of the reflector. When arranged in such a configuration, the reflector can efficiently reflect the light emitted from both light sources. The reflector also benefit from a simple geometric requirement in that they are much easier to design since the reflector is not required to have two foci. Accordingly, the cost of the vehicular lamp is reduced.

To summarize, Kobayashi is completely silent as to a light circuit for controlling the strength of the light sources, nor does it teach that the light sources are located in the vicinity of the reflector's focal point. Furthermore, Kobayashi does not teach or suggest that the strength of the infrared light and the white light may be controlled via a lighting circuit so as to result in a predetermined chromaticity.

Widel does not provide that which is missing in Kobayashi, as evidenced by the fact that Weidel is relied on by the Examiner to provide teaching of the LED light source. Therefore, a combination of Kobayashi and Weider will not teach a suggested every limitation of claim 1.

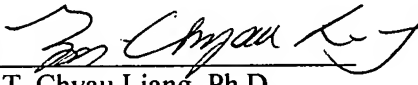
In view of the above, Kobayashi and Weidel, whether considered separately or together, do not teach or suggest each and every limitations of claim 1. Claim 1 is, therefore, patentable over Kobayashi and Weidel. For at least the same reasons, dependent claims 3 – 5 are also patentable. Accordingly, withdrawal of this rejection is respectfully requested.

Conclusion

Applicant believes this reply is fully responsive to all outstanding issues and places this application in condition for allowance. If this belief is incorrect, or other issues arise, the Examiner is encouraged to contact the undersigned or his associates at the telephone number listed below. Please apply any charges not covered, or any credits, to Deposit Account 50-0591 (Reference Number 02008/152001).

Dated: April 12, 2006

Respectfully submitted,

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